

REMARKS

Reconsideration of the above-identified application in view of the following remarks is respectfully requested.

A. Status of the Claims

Claims 1-8 are pending; claim 8 is withdrawn from consideration. Claims 1-7 stand rejected.

B. Rejections in view of Smith et al., U.S. 3,435,881

Claims 1-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,435,881 to Smith et al. ("Smith"). Applicants respectfully traverse that Smith does not suggest or disclose what the applicant claims. As elaborated below, applicants request reconsideration and withdrawal of the §103 rejection over Smith.

The Office action states that

"Smith et al. substantially show the invention as claimed except that they do not show to form the molding surface with the inner edges of the graphite laminae and that the cooling passage is formed outside of the graphite plates (laminae). However, whether a liner is provided depends on the desirable smoothness of the molding surface and thus it would have been obvious to spare the liner if the smoothness of the inner edges of the graphite laminae in Smith et al. is good enough for a casting process. Further, it would have been obvious to locate the cooling passage within the graphite laminae in Smith et al. if more intensity of cooling is-needed."

Smith is directed to an “Anisotropic Continuous Casting Mold” comprising an anisotropic material to transfer heat from the melt substantially in the direction perpendicular to the inner surface of the mold, with little heat transfer parallel to said surface. Among the embodiments disclosed by Smith is a mold having walls formed of a vertical stack of pyrolytic graphite blocks between a liner of vitreous carbon on the inner surface of said stack and a heat sink comprising, for example, a copper block around coolant ducts on the outer surface of said stack. (Smith col. 3, lines 20-56; figure.) Specifically, Smith discloses a mold comprising a graphite block formed of multiple anisotropic pyrolytic graphite plates of about ½ inch thickness *and a liner of vitreous carbon.* (See Smith col. 2, lines 22-30 and 55-59; Smith claim 1.)

It would not have been obvious to one skilled in the art to increase the cooling rate of the mould described in Smith et al. by placing the cooling tubes inside the graphite block. It would be known to those skilled in the art that graphite is a brittle material that does not allow one to easily make holes therein to allow for the insertion of cooling pipes. If one were to make holes into thick plates as disclosed in Smith et al., or in a solid block of graphite as in GB 2 034 218, there is a large risk that the graphite would crack, or at least that the inner surface of the hole would be uneven and would offer poor contact with the cooling tubes. This differentiation over Smith et al. is significant because the instant invention requires that

“[t]he size of the apertures [] be accurately matched with the size of the coolant tubes...so that a snug fit of the tubes in the apertures is achieved. Such a fit is essential to obtain an efficient heat transfer from the graphite to the liquid coolant flowing in the coolant tubes.”

(Specification page 6, lines 16-20.) Thus, applicant’s invention provides a clear distinction over Smith et al.

Moreover, according to the present invention, it is possible to place the cooling pipes inside the graphite block because the block is formed by thin lamellae, wherein the thinness allows the holes to be made without cracking the plate. Applicant's disclosure explains that the thickness of applicant's laminae is only about 1 mm. (Specification, page 5, lines 21-22.) In contrast, Smith et al. calls for plates of ½ inch thickness, significantly thicker than the thickness provided in the instant invention. As indicated above, the physical characteristics of Smith et al.'s plates (i.e., the brittle nature of the graphite) do not allow for the making of holes in the plates while maintaining the important advantages disclosed in the instant invention. Hence, the invention provides a real and beneficial improvement of a continuous casting mould that would not be obvious to one skilled in the art in view of Smith et al.

Given that applicant's invention is functionally and structurally distinguishable over Smith et al., and its elements are not disclosed or suggested by Smith et al., applicants submit that the instant invention defined in claim 1 is patentable. Furthermore, since claim 1 is believed to be patentable, applicants respectfully submit that claims 2-7, which depend from claim 1 and provide additional limitations to the structure, are also patentable.

CONCLUSION

For the above-stated reasons, this application is respectfully asserted to be in condition for allowance. An early and favorable examination on the merits is requested. In the event that a telephone conference would facilitate the examination of this application in any way, the Examiner is invited to contact the undersigned at the number provided.

THE COMMISSIONER IS HEREBY AUTHORIZED TO CHARGE ANY ADDITIONAL FEES WHICH MAY BE REQUIRED FOR THE TIMELY CONSIDERATION OF THIS AMENDMENT UNDER 37 C.F.R. §§ 1.16 AND 1.17, OR CREDIT ANY OVERPAYMENT TO DEPOSIT ACCOUNT NO. 13-4500, ORDER NO. 4872-4711.

Respectfully submitted,
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